Science

Scientific Theories

- Section 1: Review
  - Chapter 1: Electric and Magnetic Interactions
    - Objects, Properties and Materials
      - 1. know what an object is.
      - 2. Recognize objects and non objects
      - 3. Know what a property is.
      - 4. Recognize properties.
      - 5. Recognize the property of an object
      - 6. Know what a material is.
      - 7. Identify materials.
      - 8. Identify the material(s) of a given object
    - Systems and Subsystems
      - 9. Know what a system is.
      - 10. Identify systems.
      - 11. Keep track of a system
      - 12. Know what a subsystem is.
      - 13. Identify a subsystem of a given system.
    - Interactions
      - 14. Know what an interaction is.
      - 15. Recognize objects which interact.
      - 16. Recognize a touching interaction.
      - 17. Identify a system of interacting objects.
      - 18. Know what evidence of interaction is.
      - 19. Identify evidence of interaction in a circuit (bulb lights).
      - 20. Know what interaction at a distance is.
      - 21. Recognize examples of interaction at a distance.
    - Energy Transfer
      - 22. know what energy transfer is.
      - 23. Recognize when energy transfer has taken place.
      - 24. Know what an energy source is.
      - 25. Identify the energy source in a given interaction.
      - 26. Know what an energy receiver is.
      - 27. Recognise the energy receiver in a given interaction.
      - 28. Know what evidence of energy transfer is.
      - 29. Recognise examples of energy transfer taking place.
      - 30. Recognise evidence of energy transfer in a given interaction.
    - Variables and Controlled Experiments
      - 31 Know what a variable is.
      - 32. Identify variables which affect a given event.
      - 33. Know what a controlled experiment is.
      - 34. Identify the variable being tested in a controlled experiment.
      - 35. Identify the variables being kept the same in a controlled experiment
  - Chapter 2: Swinging Systems
    - The Pendulum and Periodic Motion
      - 1. Know what a pendulum is.
      - 2. Know the objects that make up a pendulum.
      - 3. Know how to set up a pendulum.
      - 4. Know variables that might affect a pendulum motion.
      - 5. Know what periodic motion is.
      - 6. Recognise systems which have periodic motion.
      - 7. Know how to count the number of complete swings of the pendulum.
      - 8. Know what frequency is.
      - 9. Given the frequency in 20 seconds be able to convert this to a frequency in one minute.
    - Measuring Frequencies
      - 10. Know what a histogram is.
      - 11. Know how to construct a histogram from given data.
      - Know how to analyse data from a histogram
      - 12. Recognise the highest result
      - 13. Recognise the lowest result
      - 14. Recognise the most frequently recorded result
      - 15. Recognise the least frequently recorded result
      - 16. Recognise the number of times a particular result is recorded
      - 17. Know how to test the effects of different variables on the pendulum.
      - 18. Recognise the variable being tested in a pendulum experiment.
      - 19. Know the variables to keep the same in a given pendulum experiment.
      - 20. Know that the main variable affecting pendulum frequency is length.
      - 21. Know how length affects pendulum frequency.
      - 22. Given the frequency of one pendulum estimate that of another with variable changed.
    - Pendulum Energy
      - 23. identify energy source for the pendulum.
      - 24. Identify energy receiver in the pendulum.
      - 25. Identify the evidence of energy transfer in the pendulum.
      - 26. Know what potential energy is.
      - 27. Identify when an object will have the greatest potential energy.
      - 28. Know what kinetic energy is.
      - 29. Know when objects have the greatest kinetic energy.
      - 30. Know when the pendulum has maximum potential energy
      - 31. Know when the pendulum has maximum kinetic energy.
      - 32. Recognise that energy changes from potential to kinetic to potential etc.
      - 33. Know what eventually happens to the pendulum if left.
      - 34. Know why the pendulum eventually stops.
  - Chapter 3: Electric Circuits
    - Bulbs & Electric Circuits
      - 1. Know how to identify the filament of a bulb.
      - 2. Know how to identify the base of a bulb.
      - 3. Know how to identify the case of a bulb.
      - 4. Know what an electric circuit is.
      - 5. Recognise electric circuits.
      - 6. Know what a closed circuit is.
      - 7. Identify closed circuits.
      - 8. Know what an open circuit is.
      - 9. Identify open circuits.
      - 10. Recognise circuits where the bulb will light.
      - 11. Recognise circuits where the bulb will not light.
      - 12. Know why a particular bulb will light.
      - 13. Identify the energy source in a circuit containing a lit bulb
      - 14. Identify the energy receiver in a circuit containing a lit bulb
      - 15. Identify the evidence of energy transfer in a circuit containing a lit bulb
    - Switches & Shorting
      - 16. Recognise a circuit where the battery is shorting.
      - 17. Know the evidence for shorting a battery (wire and battery heat UP).
      - 18. Know that a switch is a part of a circuit used to open and close the circuit.
      - 19. Recognise a switch in an illustrated circuit.
      - 20. Know how a bulb can be used as a switch (unscrew it).
      - 21. Know what a circuit tester is used for.
        - A device, consisting of a battery, wires & a bulb, which is used to test whether an object or system can conduct electricity.
      - 22.Know the objects which make up a circuit tester.
      - 23.Know what the evidence is that a given object will conduct electricity.
- Section 2: Scientific Theories
  - Chapter 4: Circuit Testers
    - Circuit testers
      - 1.Know what a circuit tester is used for.
      - 2.Know the objects which make up a circuit tester.
      - 3.Know what the evidence is that a given object will conduct electricity.
    - Electrical Conductors and Insulators
      - 4. Know how to test whether objects can close circuits using a circuit tester.
      - 5. Know examples of objects which can close circuits.
      - 6. Know examples of objects which can not close circuits.
      - 7. Know what an electrical conductor is.
      - 8. Know what an electrical insulator is.
      - 9. Recognise examples of electrical conductors.
      - 10. Recognise examples of electrical insulators (non conductors).
      - 11. Know which parts of the bulb are electrical conductors.
      - 12. Recognise materials of electrical conductors.
      - 13. Recognise materials of electrical insulators (non conductors).
  - Chapter 5: Electrical Circuit Puzzles
    - Using Electrical Circuit Puzzles
      - 1. Know how circuit puzzles are tested.
      - 2. Given results of tests on a circuit puzzle recognise a correct theory about the arrangement of aluminium foil inside it.
      - 3. Predict when the circuit tester bulb will light given the arrangement of the foil inside the puzzle.
      - 4. Predict when the circuit tester bulb will not light given the arrangement of the foil inside the puzzle.
    - Inferences
      - 5. Revise what infer and inference mean.
      - 6. Know what observe means.
      - 7. Recognise an observation (as opposed to an inference).
      - 8. Recognise an inference (as opposed to an observation).
  - Chapter 6: "Inventing" Scientific Theories
    - 1. Know what a scientific theory is.
    - 2. Recognise a useful scientific theory for a given situation.
    - 3. Know what is inferred in a circuit puzzle.
    - 4. Know how to use a theory about a circuit puzzle arrangement to predict further puzzle test results.
    - 5. Know what the difference between a theory and an observation is.
    - 6. Know that observations and inferences are used to make scientific theories.
- Section 3: A Color Theory
  - Chapter 7: Investigating Colored Light
    - 1. Know what color a white sheet appears through a single color acetate (same color as acetate).
    - 2. Know what color a black sheet appears through any colored acetate.
    - 3. Know what happens when white light falls on a colored surface (looks the same color as the surface).
    - 4. Know what happens when light of one color falls on a surface of the same color (looks the same color)
    - 5. Know what happens when light of one color falls on a white surface (looks the color of the light).
    - 6. Know what happens when light of any color falls on a black surface
  - Chapter 8: "Inventing" a Theory of Colored Light
    - Color of Light
      - 1. Know that the color of light which comes through an acetate filter is the color of that filter.
      - 2. Know what white light or colorless light is.
      - 3. Know why white light is so called.
    - Prisms
      - 4. Know what a prism is.
      - 5. Know what a prism is made of.
      - 6. Know what happens when a beam of white light is passed through a prism.
      - 7. Know what a spectrum is.
      - 8. Know other examples of spectra formed (e.g. rainbows).
    - Theory of Colored Light
      - 9.Know that white light is made up of 7 colors (red, orange, yellow, green, blue, indigo, violet).
      - 10. Know that the prism separates these colors. 1. Know that filtered light of one color is not changed by a prism.
      - 12. Know what happens when other colored light consisting of more than one color is passed through a prism (using acetate filters).
      - 13. Know what the word transmit means.
      - 14. Recognise the elements of a Theory of Colored Light.
    - Color Subtraction and Addition
      - 15. Know what the word absorbed means.
        - If something is absorbed it is taken in by an object & not transmitted or reflected. For example red light is absorbed by a green surface.
      - 16. Know what color subtraction means: i.e. that colored acetates transmit
        - The absorption of certain colors of light by filters. See white light.
      - 17.one color whilst absorbing all the other colors from white light. r. Recognise the colors absorbed when white light goes through a colored
      - acetate, given ray diagrams. J. Predict the color of light passing through multiple colored acetates, given
      - ray diagrams for white light passing through a single colored acetate.
      - 19.Know what color addition means: i.e. that where red, yellow, green and
        - The combination of single colors of light to form white light.
      - blue light is combined white light results.
- Section 4: A Magnetic Field Theory
  - Chapter 9: Discoveries with Colored Light.
  - Chapter 10: Exploring Magnetic Interactions
    - Interactions With Magnets
      - 1. Know examples of objects which interact and don't interact with magnets.
      - 2. Know the materials or objects which are attracted to magnets (iron, steel, nickel and cobalt).
      - 3. Know that the ends of magnets are 2 different types and either attract or repel one another.
      - 4. Know that the amount of interaction between magnets depends on the distance they are from one another.
      - 5. Know how to tell for sure if objects are magnets (repelled by 1 side of another magnet).
      - 6. Know how to differentiate an object made of magnetic material from a magnet.
    - Temporary and Permanent Magnets
      - 7. Know how to make a metal object into a temporary magnet.
      - 8. Know what a temporary magnet is.
      - 9. Know what a permanent magnet is.
      - 10. Know examples of permanent magnets, given information about them.
      - 11. Identify objects which can be made into temporary magnets.
      - 12. Identify objects which cannot be made into temporary magnets.
  - Chapter 11: "Inventing" the Magnetic Field
    - 1. Recall what interaction at a distance is,
    - 2. Know that a magnetic field is the 'something' causing the repulsion of one magnet by another.
    - 3. Know that magnetic fields are not objects.
    - 4. Know how to detect a magnetic field, using its interaction with objects made of magnetic material, other magnets.
    - 5. Know that compass needles can be used to show the direction of magnetic fields.
  - Chapter 12: Investigating Magnetic Fields
    - Detecting Magnetic Field Directions
      - 1. Know that the compass pointer is a magnet which interacts with and allows detection of magnetic fields.
      - 2. Know what happens to the compass as it is moved further from the magnet.
      - 3. Know the compass needle points in opposite directions at each end of the magnet.
      - 4. Given the direction of a compass needle at one end of a magnet know the direction at the other end.
      - 5. Given the direction of a compass needle at one end of a magnet know the direction along the sides.
      - 6. Know the magnetic field pattern for alnico and ferrite magnets.
    - Iron Filings and Magnetic Fields
      - 7. Know how to make a magnetic field pattern using magnet, iron filings and paper.
      - 8. Know that the filings nearest the magnet are standing upright.
      - 9. Know why the filings nearest the magnet stand upright (magnetic fields extend in 3 dimensions).
      - 10. Know that filings are densest around two opposite ends (alnico) or sides (ferrite) of the magnets.
      - 11. Know that the density of the iron filings is evidence of the strength of the magnetic field.
      - 12. Know where the magnetic field is strongest in the 2 types of magnets.
      - 13. Know what pattern of iron filings is produced by 2 alnico magnets close together (opposite poles facing).
      - 14. Know what pattern of iron filings is produced by 2 alnico magnets far apart (same as single magnets).
    - Magnetic Poles
      - 15. Know that (magnetic) poles are areas on magnets opposite to each other where the magnetic field strength is greatest.
      - 16. Know that like poles repel, unlike poles attract.
      - 17. Know the position of the poles on alnico and ferrite magnets.
    - The Earth as a Magnet
      - 18. Know what compasses are normally used for.
      - 19. Know the Earth has magnetic fields.
      - 20. Know how to find North using a compass.
      - 21. Know The Earth acts like a large magnet.
      - 22. Know how to use magnetic boats to find North.
      - 23. Know what happens to a freely suspended magnet.
      - 24. Know that the magnet pole which faces magnetic north is called the magnet's north seeking pole or north pole.
      - 25. Know that the pole opposite the magnet's north pole is its south seeking pole or south pole.
      - 26. Be able to relate a magnet's poles to The Earth 's magnetic poles.
  - Chapter 13: The Magnetic Field of a Circuit
    - Magnetic Fields of Wire Coils in Circuits
      - 1. Know how a coil in a closed circuit will interact with a compass.
      - 2. Know how a coil in a closed circuit will interact with a permanent magnet.
      - 3. Know what happens when an alnico magnet stands on its edge in the centre of a coil and the circuit is opened/closed.
      - 4. Know that closed circuits act as magnets, open circuits don't.
    - Electromagnets
      - 5. Know that a rivet with a coil surrounding it acts as a magnet when the circuit is closed.
      - 6. Know what materials the rivet can be.
      - 7. Know the evidence that the coil is acting as a magnet.
      - 8. Recognise that this is a temporary magnet.
      - 9. Know that a system which acts as a magnet only when a circuit is closed is an electromagnet.
      - 10. Know the energy source for the electromagnet used is the battery.
      - 11. Know that the energy source for a permanent magnet is the magnet itself.
      - 12. Know how to make the rivet electromagnet stronger.
      - 13. Know where the poles of the rivet electromagnet are (the ends).
      - 14. Know the evidence of the position of the poles on the electromagnet (direction of compass needle).
      - 15. Know variables which affect the strength of the electromagnet.
    - Experiments with Electromagnets
      - 16 Know that wrapping wires around a steel rivet increases the magnetic field strength.
      - 17 Know how to test the strength of electromagnets (how many steel discs can be picked up).
      - 18 Know the variables which must be kept the same in the experiment.
      - 19 Know what the trend of the data is (more coils, more discs picked up).
      - 20 Know that increasing the number of coils on the rivet increases the strength of the electromagnet.
      - 21 Know what other variables might affect experimental results (e.g. battery strength).
- Section 5: An Electricity Theory
  - Chapter 14: Investigating Circuits.
    - 1. Recognise if illustrated circuits are open or closed. Given the brightness of a bulb in a circuit with 1 battery and 1 bulb, predict the brightness of bulbs in circuits with:
    - 2. A second battery is added in series.
    - 3. A second battery is added in parallel.
    - 4. A second battery is added in series and the opposite direction to the first.
    - 5. A second bulb is added in series.
    - 6. A second bulb is added in parallel.
    - 7. A second battery and a second bulb are added in series
    - 8. A wire is added in parallel to the bulb.
    - 9. Know variables which affect bulb brightness.
    - 10. Revise what controlled experiment and variable mean.
  - Chapter 15: "Inventing" an Electricity Theory.
    - Energy Transfer in Electric Circuits.
      - 1. Identify energy sources in circuit diagrams.
      - 2. Identify energy receivers in circuit diagrams.
      - 3. Identify objects which are not energy sources in circuit diagrams.
      - 4. Identify objects which are not energy receivers in circuit diagrams.
    - Electricity Theory
      - 5. Know that electricity transfers energy from the battery to other parts of the circuit.
      - 6. Know that electricity does not go along open circuits.
      - 7. Know that electricity goes along closed circuits.
      - 8. Know that bulbs are lit by electricity passing through them.
      - 9. Know that electricity transfers energy to bulbs.
      - 10. Know that electricity goes through wires attached to batteries.
      - 11. Know arrangements of batteries which will not make bulbs light.
      - 12. Recognise the above as elements of the Electricity Theory.
  - Chapter 16: Making an Electroscale
    - Electroscales
      - 1. Revise the fact that electricity flowing through a wire coil causes a magnetic field.
      - 2. Revise what a magnetic field is.
      - 3. Know that an electroscale is a device used to measure electricity.
      - 4. Know the apparatus necessary to build an electroscale.
      - 5. Know that electroscales work by interaction of permanent magnets with the magnetic field created by electricity flowing.
    - Using Electroscales
      - 6. Know that the deflection of the pointer increases with the amount of electricity flowing.
      - 7. Know the direction of the pointer deflection shows the direction of electricity flowing.
      - Given the deflection (units, direction) for a circuit with 1 battery and 1 bulb, predict the deflection of the electroscale if:
        - 8. The battery is reversed A second battery is added in series.
        - 9. It A second battery is added in parallel.
        - 11. A second battery is added in series and the opposite direction to the first.
        - 12. A second bulb is added in series.
        - 13. A second bulb and a second battery are added in series. 4. A wire is added in parallel to the bulb.
        - 15. A wire is added in parallel to the electroscale.
        - 16. Know the variables which affect the amount of electricity in a circuit.
- Section 6: A Ray Theory of Light
  - Chapter 17: Exploring Images
    - Light Sources and Images
      - 1. Know what a primary light source is
      - 2. Know what a secondary light source is
      - 3. Know examples of primary light sources.
      - 4. Know examples of secondary light sources.
      - 5. Know why an object is called a primary light source.
      - 6. Know why an object is called a secondary light source.
      - 7. Know what an image is.
      - 8. Know examples of images.
      - 9. Know how images are made
      - 10. Know how to make an image disappear (block the light source).
      - 11. Know how images are different from ordinary pictures of objects (can't be seen when the object is absent).
    - Properties of Images
      - 12. Know images from mirrors are same way up, reversed, and about the same size as the object.
      - 13. Know that magnifiers are types of lenses.
      - 14. Know light rays cross over after going through a lens.
      - 15. Know that lenses sometimes produce inverted images, sometimes produce upside down images and sometimes produce images which are smaller and sometimes larger than the object.
  - Chapter 18: "Inventing" Light Rays
    - 1. Know what light beams are.
    - 2. Know what light rays are.
    - 3. Know that light beams are made up of light rays.
    - 4. Know what a focus is.
    - 5. Recognise a focus on a ray diagram.
    - 6. Know differences observed between beams from light sources close to the slit and light sources far from the slit.
  - Chapter 19: A Ray Theory of Light
    - Reflecting
      - 1. Know what happens to a light ray which hits a mirror.
      - 2. Know what reflect means.
      - 3. Know how to draw a mirror.
      - 4. Know how to draw light rays (straight lines, arrows).
      - 5. Be able to draw in positions of reflected rays given mirror and incident ray.
      - 6. Given two rays be able to find the mirror's position.
    - A Ray Theory of Light
      - 7. Know that light rays go outwards from a light source.
      - 8. Know that light rays may interact with a mirror, lens or other object.
      - 9. Know that rays go in a straight line unless they interact.
      - 10. Know that light rays spread apart as they get further from a light source.
      - 11. Know that rays are reflected if they hit a mirror.
      - 12. Know that rays cross after they pass through a water lens.
      - 13. Know that rays are blocked by dark objects.
      - 14. Recognise statements which are part of the Ray Theory of Light.

Ecosystems

- Section 1: Reviewing Concepts and Creating Classroom Ecosystems
  - Chapter 1: Aquarium - Terrarium Systems
    - 1. Recognise animals in lists etc.
    - 2. Recognise plants in lists etc.
    - 3. Know what a terrarium is.
    - 4. Know the term aquatic.
      - Associated with water. Aquatic organisms are organisms which live exclusively in water.
    - 5. Know what an aquarium is.
      - An artificial habitat for aquatic organisms.
    - 6. Recognise the plastic island as the terrarium part of the aquarium-terrarium.
    - 7. Know what an organism is.
    - 8. Recognise examples of organisms.
    - 9. Know what a habitat is.
    - 10. Recognise habitat of a particular organism.
    - 11. Know what an environmental factor is.
    - 12. Recognise environmental factors for a given organism.
    - 13. Know what an abiotic environmental factor is.
      - Something which is not caused by organisms. An abiotic environmental facte caused by something other than organisms. For example air, water, wind.
    - 14. Recognise abiotic environmental factors.
    - 15. Know what a biotic environmental factor is.
    - 16. Recognise biotic environmental factors.
    - 7. Recognise the environmental factors in the terrarium - aquarium.
    - 18. Know how to classify environmental factors as biotic or abiotic.
  - Chapter 2: Adding Organisms to the Aquariums.
    - Know the names of organisms added to the aquariums.
    - Know how hornwort and algae get their food (revision).
      - Plants are too small to be seen with the naked eye. They give the characteristic green color to pond water.
    - Recognise pictures of daphnia.
    - Revise (from lower grades) what daphnia eat.
    - Recognise pictures of pond snails
    - Know what pond snails eat.
    - Know what herbivores are.
    - Recognise and know examples of herbivores
    - Know where herbivores go on the community chart
  - Chapter 3: Guppies, Lady Beetles and Aphids.
  - 1. Know the names of all the organisms added to the aquarium terrarium.
  - 2. Know what a population is.
  - 3. Recognise populations.
  - 4. Know what population size is.
  - 5. Recognise a larger population
  - 6. Know what immigration is.
  - 7. Recognise examples of immigration.
  - 8. Know what emigration is.
  - 9. Recognise examples of emigration.
  - 10. Recognise factors which can increase a population size.
  - 11. Recognise factors which can decrease a population size.
  - 12. Know what a barrier to dispersal is.
    - Something which prevents the movement of organisms from one area to another. For example snakes cannot emigrate from Engl & to Irel & because the sea forms a barrier to dispersal.
  - 13. Recognise a barrier to dispersal.
  - 14. Know what reproduction is.
  - What Animals Eat
  - 15. Know the feeding relationships in the aquarium-terrarium
  - 16. Know what carnivores are.
  - 17. Recognise and know examples of carnivores
  - 18. Know where carnivores go on the community chart
  - 19. Know what omnivores are.
  - 20. Recognise and know examples of omnivores.
  - 21. Know where omnivores go on the community chart
  - 22. Be able to classify aquarium-terrarium organisms as carnivores, herbivores, omnivores or plants.
  - Reviewing Food Chains and Community Charts
  - 23. Know what arrows in the community chart mean.
  - 24. Know where to place arrows on the community chart.
  - 25. Know where to place the aquarium - terrarium organisms in the chart.
  - 26. Know what a food chain is.
  - 27. Know how to construct a food chain (recognise a correctly constructed food chain)
  - 28. Know what all food chains must start with.
  - 29. Know how to construct a food web.
  - 30. Know how to place organisms from a food web on a community chart.
  - Reviewing Decomposers
  - 31. Know what decomposers are.
  - 32. Recognise examples of decomposers (moulds, bacteria yeast).
  - 33. Know what happens to dead organisms that are not eaten.
  - 34. Know what moulds are.
  - 35. Know what bacteria are.
    - Microscopic decomposing organisms, characterised by a bad smell from the organism being decomposed.
  - 36. Know evidence of decomposition by moulds.
  - 37. Know evidence of decomposition by bacteria.
  - 38. Know where decomposers go on the community chart.
  - 39. Know the importance of decomposers.
  - 40. Know where to draw arrows to decomposers on the community chart.
  - Reviewing Raw Materials
  - 41. Know what happens to organisms which have decayed.
  - 42. Know what raw materials are.
  - 43. Know examples of raw materials.
  - 44. Know which organisms produce minerals.
  - 45. Know which organisms use minerals.
  - 46. Know what raw materials are used for.
  - 17. Know where raw materials go on the ecosystem chart
  - 48. Know where to draw arrows to and from raw materials (minerals) on the community chart.
  - Reviewing Communities, Producers and Consumers
  - 49. Know what producers are
  - 50. Know where producers go on the chart. 51. Recognise producers in lists etc.
  - 52. Know what consumers are.
  - 53. Know where consumers go on the chart.
  - 54. Recognise consumers in lists etc.
  - 55. Know what a community is.
  - 56. Recognise examples of different communities.
  - Neighbourhood Communities
  - 17. Recognise a population which protects another population. 58. Know that humans add mineral fertilisers to the soil. .19. Know examples of minerals added by humans (phosphates, nitrates, etc.). JO. Know that minerals are not food for plants. 61. Know plants get their food by photosynthesis.
  - Chapter 4: Aquarium - Terrarium System Changes
  - Know what an environmental factor is.
  - Recognise environmental factors for a given organism.
  - Know what an environment is.
  - Identify environmental factors affecting a particular organism.
  - Recognise why a plant population might increase.
  - Recognise why a plant population might decrease.
  - Recognise why a herbivore population might increase.
  - Recognise why a herbivore population might decrease.
  - Recognise why a carnivore population might increase. 0. Recognise why a carnivore population might decrease. 11. Recognise why a decomposer population might increase.
  - 12. Recognise why a decomposer population might decrease.
  - 13. Recognise what the range of a given environmental factor in an experiment is, given data. v
  - 14. Recognise what the optimum amount of a given environmental factor in an experiment is, given data.
  - 15. Given a community chart, say how changing 1 population will affect the other populations.
  - Chapter 5: "Inventing" the Concept of Ecosystem
  - 1. Know what environmental factors are required by organisms in the aquarium - terrarium other than food.
  - 2. Identify an environmental factor required by a particular organism.
  - 3. Know how to draw arrows on the community chart for environmental factors.
  - 4. Know what an ecosystem is.
  - 5. Know what an ecosystem chart is.
  - 6. Know how to use an ecosystem chart to represent a given ecosystem.
  - Section 2: The Water Cycle
  - Chapter 6: Where Does the Moisture Come From?
  - 1. Know possible sources of water on the walls and lid of the aquarium.
  - 2. Know how to set up an experiments to see if each item in the aquarium produces moisture (put individual items in a plastic bag and wait.
  - 3. Know what variables to keep the same in the experiment.
  - 4. Know how the variables are kept the same.
  - 5. Know what happens in the experiment.
  - 6. Know what the evidence is that an object produces moisture
  - 7. Know which items produced least and most moisture.
  - Chapter 7: Evaporation
  - Water Loss Experiments
  - 1. Know how to set up an experiment to determine effect of heat on evaporation.
  - 2. Know what variables to keep the same in the experiment.
  - 3. Know how the variables are kept the same.
  - 4. Know that the temperature was higher under the lamp.
  - 5. Know that uncovered tumblers lost water.
  - 6. Know that uncovered tumblers under light lost more water.
  - 7. Know why uncovered tumblers under light might loose more water.
  - 8. Know where drops of water in closed containers must come from.
  - 9. Know which closed containers had more drops of water.
  - Evaporation
  - 10. Know what evaporation means.
  - 11. Know what effect higher temperature has on evaporation.
  - 12. Know what the evidence is that higher temperatures cause more evaporation.
  - 13. Know the gas formed from the evaporation of water
  - Chapter 8: Condensation
  - Condensation Experiments
  - 1. Know how to set up the condensation experiment (put ice cubes in a vial with water).
  - 2. Know what happens in the experiment (water condenses on the outside of the vial).
  - 3. Know the evidence that the moisture did not come from inside the can.
  - 4. Know where the moisture must come from.
  - 5. Know other examples of water coming from air (e.g. breathe on a mirror).
  - Condensation
  - 6. Know what condensation is.
  - –. Recognise water vapour changing into moisture as an example of
  - condensation. 3. Know what is necessary for condensation to occur (surface cooler than
  - the air).
  - 9. Know what humidity is.
  - 10. Know where the moisture forming on windows is from
  - Chapter 9: "Inventing" the Water Cycle
  - Evaporation - Condensation Experiments
  - 1. Know how to set up an evaporation-condensation experiment. where to place lamp and tumbler.
  - 2. Know what happens in the evaporation-condensation experiment.
  - 3. Recognise evaporation in the water cycle experiment
  - 4. Recognise condensation in the water cycle experiment
  - The Water Cycle
  - 5. Know the term 'water cycle'
  - 6. Know the major sources of water on Earth.
  - 7. Know the main methods by which water leaves the Earth's surface.
  - 8. Know what transpiration is.
  - 9. Know how rainfall is returned to the sea.
  - 10. Know that water is repeatedly recycled on The Earth.
  - 11. Know that no new water enters or leaves The Earth.
  - 12. Know how organisms far from bodies of water get their water (i.e. rain).
  - 13. Know what precipitation is.
  - 14. Know and recognise examples of precipitation.
  - 15. Know what fog is.
  - 16. Know how fog is formed
  - 7. Know why fog disappears before noon. 18. Recognise when moisture evaporating is due to the Sun's heat.
  - Section 3 : The Oxygen-Carbon Dioxide Cycle Chapter 10: Breath and BTB
  - Bromthymol Blue Experiments
  - 1. Know that BTB is short for bromothymol blue.
    - An indicator for carbon dioxide. In water it turns yellow when there is a lot of carbon dioxide present, blue when there is only a small amount (or none) & green when there are intermediate amounts.
  - 2. Know that BTB changes color in water that has carbon dioxide blown through it.
  - 3. Know how to make the BTB solution change color.
  - 4. Know what color the BTB turns when you blow through it (green or yellow).
  - Carbon Dioxide
  - 5. Know that carbon dioxide in breath causes the BTB to change color.
  - 6. Know that BTB is an 'indicator for CO2.
  - 7. Know the abbreviation of carbon dioxide is COo.
  - 8. Know that the BTB changes from blue to green TO yellow as more carbon dioxide is added.
  - 9. Know what variables affect the amount of color change (length of breath, different amounts of BTB in the original solution, etc.)
  - Chapter 11: Where Did the Yellow Go?
  - 1. Know that the solutions turn back from yellow or green to blue when left overnight.
  - 2. Revise what a controlled experiment is.
  - 3. Know how to set up experiments to see what turns yellow BTB blue.
  - 4. Know that capped vials of yellow BTB do not change to blue.
  - 5. Know that the experimental conclusion is that yellow BTB turns blue because carbon dioxide leaves the solution or that something from the air went into the solution.
  - 6. Know what a reproducible experiment is.
  - 7. Recognise a reproducible experiment.
  - Chapter 12: Carbonated Water and BTB
  - 1. Know what happens when BTB is added to carbonated water (turns yellow and fizzes).
  - 2. Know that BTB turns yellow jn the carbonated water because of the large amount of carbon dioxide in it.
  - 3. Know that gas is leaving the carbonated water.
  - 4. Know how To set up the experiment to pass carbon dioxide from the flask into the beaker/plastic bag.
  - 5. Know the purpose of the plastic bag.
  - 6. Know that the gas flowing through the tube is carbon dioxide.
  - 7. Know what the evidence is that the gas is carbon dioxide.
  - 8. Know which way the gas is flowing (flask -> beaker)
  - 9. Know what happens to the water in the beaker as gas flows into it (turns from blue to green or yellow).
  - 10. Know results from the soda water/BTB experiment.
  - 11. Know conclusions from the soda water/BTB experiment.
  - 12. Recall observations when beaker in bag put under lamp (droplets of water inside).
  - Chapter 13: Exchange of Gases in Organisms Animals in the light.
  - 1. Know the symbol for oxygen is O2.
  - 2. Know how to set up an experiment to see if animals (snails) produce carbon dioxide in the light.
  - 3. Know the variables to keep the same.
  - 4. Know how the variables were kept the same.
  - 5. Know the necessity of controls.
  - 6. Recognise what the control is in an experiment.
  - 7. Know what happens to the color of blue BTB solution at the end of the experiment.
  - 8. Know the conclusion from the experiment.
  - Plants in the light.
  - 9. Know how to set up an experiment to see if plants (hornwort) use carbon dioxide.
  - 10. Know the control experiment colors do not change.
  - 11. Know what happens to the colour of yellow BTB at the end of the experiment
  - 12. Know the conclusion from the experiment. (Know which part of the hypotheses on carbon dioxide/oxygen use/production are supported. Recognise that we cannot conclude anything about O2 production/use from the experiment.)
  - Chapter 14: "Inventing" the Oxygen-Carbon Dioxide Cycle Carbon dioxide production and use in the dark
  - 1. Know how to set up experiments to show carbon dioxide production and use in the dark.
  - 2. Know what happens to the color of BTB with snails in the dark.
  - 3. Know what happens to the color of BTB with hornwort in the dark.
  - 4. Know the conclusion that in the dark snails release carbon dioxide.
  - 5. Know the conclusion that in the dark hornwort releases carbon dioxide.
  - The Oxygen-Carbon Dioxide Cycle
  - 6. Know the hypothesis that in the dark snails take in oxygen and release carbon dioxide.
  - 7. Know the hypothesis that in the dark hornwort takes in oxygen and releases carbon dioxide.
  - 8. Know that the plant uses the food to grow and develop.
  - 9. Know the plants use oxygen and produce carbon dioxide all the time.
  - 10. Know that carbon dioxide used during the day is much more than carbon dioxide produced.
  - 11. Know how to draw and label an oxygen-carbon dioxide cycle.
  - 12. Know the equation for photosynthesis.
  - 13. Know the term respiration.
  - 14. Know the equation for respiration.
  - 15. Know the purpose of respiration (produces energy).
  - 16. Know organism present if green BTB goes blue in light, yellow in dark.
  - 17. Know organism present if green BTB goes yellow in light, yellow in dark.
  - 18. Recognise animals as organisms which produce CO2/use up O2.
  - 19. Recognise CO2 as gas produced by plants and animals, used up by plants.
  - 20. Recognise O2 as gas used by all organisms.
  - 21. Recognise plants as organisms which produce & use up both CO2 and O2.
  - 22. Recognise respiration as process which produces CO2.
  - 23. Recognise respiration as process which uses up O2.
  - 24. Recognise photosynthesis as process which uses up CO2.
  - 25. Recognise photosynthesis as process which produces O2.
  - 26. Know that photosynthesis only takes place in the light.
  - 27. Recognise respiration as the process which takes place in the dark and the light.
  - Hornwort and Snails.
  - 28. Know how to set up an experiment with hornwort and snails in the same vial with green BTB. Know what is likely to happen in the experiment.
  - 29. Know what would be likely to happen in the experiment if it were put in the dark.
  - Chapter 15: Land Plants and Gases
  - 1. Know how to set up the pea plant/BTB experiments in light and dark.
  - 2. Know what the purpose of the plastic bag is.
  - 3. Know what color the BTB will turn in each case.
  - 4. Know that the conclusions of the experiments are the same as for hornwort.
  - Section 4: Cycles in an Ecosystem Chapter 16: Cycles in an Ecosystem Revising The Community Chart
  - 1. Revise what producers are and do.
  - 2. Revise what consumers are and do.
  - 3. Revise what decomposers are and do.
  - 4. Revise what carnivores are.
  - 5. Revise what herbivores are.
  - 6. Revise where plants go on the ecosystem chart.
  - 7. Revise where herbivores go on the ecosystem chart.
  - 8. Revise where carnivores go on the ecosystem chart.
  - 9. Revise where producers go on the ecosystem chart.
  - 10. Revise where decomposers go on the ecosystem chart.
  - 11. Revise where raw materials go on the ecosystem chart.
  - 12. Revise where consumers go on the ecosystem chart.
  - 13. Revise where the arrows go on the ecosystem chart.
  - The Food-Mineral Cycle
  - 14. Know what the food mineral cycle is.
  - 15. Know how the food mineral cycle is represented on the ecosystem chart
  - 16. Know that minerals are put back into the soil by decomposers.
  - 17. Know which organisms are necessary for the food-mineral cycle to continue.
  - Adding the Water Cycle to the Ecosystem Chart
  - 18. Know how to add the water cycle to the ecosystem chart 9. Know what would happen to each organism type if there was no rain.
  - 20. Recognise that the water cycle can continue without life.
  - Adding the Oxygen-Carbon Dioxide Cycle to the Ecosystem Chart
    - An odourless colorless gas found naturally in the air which is produced in the process of respiration & used up in the process of photosynthesis. Symbol CO2.
  - 21. Know how to add the oxygen-carbon dioxide cycle to the community chart.
  - 22. Know where to draw the arrows to and from carbon dioxide on the community chart.
  - 23. Know which organisms produce oxygen. >4. Know which organisms use oxygen.
  - 25. Know which organisms produce carbon dioxide. K. Know which organisms use carbon dioxide.
  - 27. Know what would happen if the oxygen-carbon dioxide cycle was interrupted.
  - 28. Know that life is necessary for the carbon dioxide-oxygen cycle to continue.
  - Chapter 17: Natural Ecosystems Identifying Ecosystems
  - '. Revise what precipitation means.
  - 1. Know the annual precipitation in a tundra.
  - 3. Know the annual precipitation in a taiga.
  - 4. Know the annual precipitation in a deciduous forest.
  - 5. Know the annual precipitation in a tropical rain forest.
  - 6. Know the annual precipitation in a scrub forest.
  - 7. Know the annual precipitation in a grassland. 5. Know the annual precipitation in a desert.
  - 7. Know the seasons in a tundra. .0. Know the seasons in a taiga. 1. Know the seasons in a deciduous forest.
  - 12. Know the seasons in a tropical rain forest.
  - 13. Know the seasons in a scrub forest.
  - 14. Know the seasons in a grassland.
  - 15. Know the seasons in a desert.
  - 16. Know the plant types in a tundra.
  - 17. Know the plant types in a taiga.
  - 18. Know the plant types in a deciduous forest.
  - 19. Know the plant types in a tropical rain forest.
  - 20. Know the plant types in a scrub forest.
  - 21. Know the plant types in a grassland.
  - 22. Know the plant types in a desert.
  - 23. Identify the ecosystem type given information about plant types, rainfall, seasons.
  - 24.identify abiotic environmental factors causing the type of ecosystem lived in.
  - 25. Know how prevailing winds cause differing amounts of precipitation.
  - 26. Know how a change in prevailing winds would change the ecosystems.
  - Adaptations Of Organisms
  - 27. Know the types of plants and animals found in desert ecosystems.
  - 28. Identify survival problems for organisms in desert ecosystems.
  - 29. Identify organisms adapted for desert ecosystems.
  - 30. Know how organisms are adapted.
  - Chapter 18: Ecosystems and Humans Changes to Ecosystems
  - 1. Identify changes made to pictured ecosystems by humans.
  - 2. Identify changes in ecosystems that are favourable to humans.
  - 3. Identify changes made by humans to ecosystems which are harmful to other organisms.
  - City Ecosystems
  - 4. Know that city ecosystems have replaced the natural ecosystems.
  - 5. Know what competitors humans have in cities.
  - 6. Know how humans reduce or remove competition.
  - 7. Know ways in which humans control their environment.
  - 8. Know where power, heat and water come from in cities.
  - Section 5: Pollution Chapter 19: Algae and Fertiliser
  - Algae and Fertiliser Experiments
  - 1. Know how to set up an experiment to measure the effect of amount of fertiliser on algae.
  - 2. Know how to use a control in the experiment.
  - 3. Know how to adjust the temperature in the experiment (change height of lamp).
  - 4. Know which variables to control in the experiment (light, temperature, amount of algae to start with).
  - 5. Know how the variables are controlled.
  - Organic Matter
  - 6. Know what happens to dead algae
  - 7. Know what organic matter is.
  - 8. Know that organic matter is made originally from green plants.
  - 9. Know that decomposers use up oxygen in the water.
  - 10. Know that decomposers release carbon dioxide into the water.
  - Conclusions From the Algae Experiment.
  - 11. Know what happened to the population size of algae with increased fertiliser.
  - 12. Know why the algae population increased.
  - 13. Know why the algae population gradually decreased.
  - 14. Know the effect on decomposer population size of the increase in dead algae.
  - T5. Know how the increased numbers of decomposers affect amounts of carbon dioxide and oxygen.
  - Chapter 20: Keeping Track of Fertiliser
  - 1. Know that BTB reacts with acids formed by fertilisers in the soil
  - Know how to set up a fertiliser in soil experiment.
  - Know how to take a soil sample.
  - Know how to use a control of unfertilised soil.
  - Know that the fertiliser moves through the soil. : Realise the consequences of fertiliser moving through soil into rivers etc.
  - Chapter 21: "Inventing" Pollution Carbon Dioxide and Fish
  - Know what happens when the seltzer tablets dissolve.
  - Know how to set up the carbon dioxide generator.
  - Know how to test if the gas from seltzer tablets is carbon dioxide.
  - Know how to set up the carbon dioxide and fish experiment
  - Know the control experiment involves using non gassed water.
  - Know how guppies react on being added to water saturated with carbon
  - dioxide.
  - Know the colors of BTB when added to carbon dioxide saturated and
  - control.
  - Pollution
  - Know what causes the differences in behaviour of guppies (carbon
  - dioxide).
  - Realise that carbon dioxide is harmful to guppies.
  - 10. Know what pollution is.
  - 11. Know what a pollutant is.
  - 12. Know how a lake might become polluted with carbon dioxide (not enough plants or too many animals).
  - 13. Identify pollutants.
  - –. Know the effects weed killer or fertiliser would have on life in a lake.
  - 15. Know that useful substances can become pollutants if increased beyond the level a particular organism can use or tolerate.
  - 16. Know what substances were increased in the experiments done.
  - 17. Classify objects and materials as pollutants, non pollutants, or safe materials and substances.
  - Chapter 22: Food as a Pollutant
  - Setting Up a Food Pellets and Snails Experiment
  - 1. Know how to set up a food pellet and snails experiment.
  - 2. Know which two experiments are controls.
  - 3. Know what food is.
  - 4. Know that consumers use producers as food
  - Results and Analysis of a Food Pellets and Snails Experiment
  - 5. Know why snails try to escape (from food as a pollutant).
  - 6. Know animals which sense a condition and move to avoid it act as bioindicators.
  - 7. Know what happens to the water in the experiment.
  - 8. Know that the cloudy water tests positive for carbon dioxide with BTB.
  - Bacteria
  - 9. Know the organisms responsible for the cloudiness and carbon dioxide are bacteria.
  - 10. Know the evidence of the presence of bacteria.
  - 11. Know what the bacteria are feeding on in the experiment.
  - 12. Know that excess food causes an increase in bacteria.
  - 13. Know that the increase in bacteria cause an increase in carbon dioxide.
  - 14. Know that if the snails are not harmed they can counter these effects by reproducing and eating the food, balancing the cycles.

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